

FLEXPRINT® ACCORDION

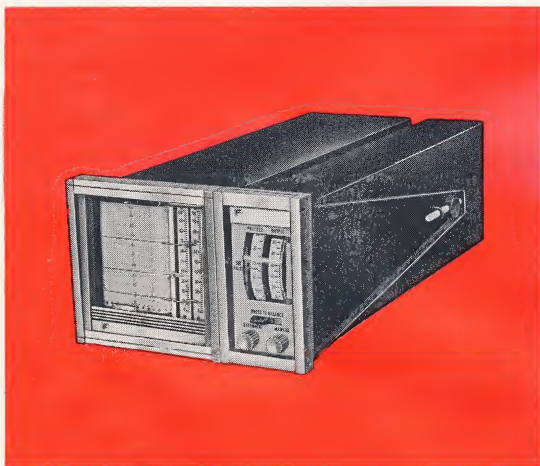
flexible printed circuitry

allows complete access to flush mounted instruments for inspection and routine maintenance. reliability was increased while cost was cut in half

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FLEXPRINT®



THE APPLICATION

Two companion process control instruments manufactured by Fischer & Porter. Both units use similar FLEXPRINT ACCORDION cables to interconnect the fixed back panel terminal strip to the removable chassis printed circuit board. The accordion shape allows the chassis to be drawn completely out of 20" panel mounted case for inspection.

THE PROBLEM

The pre-prototype for each unit was designed with steel spring around the conventional 12 wire harness to coil it back into the case as chassis was inserted. The spring brought significant physical forces on the terminations that caused early failure of solder joints. The coiled cable was also too bulky. Flat cabling wound on a spring loaded reel was next used. This was easier to handle in servicing but still took considerable space in the case, and there was still a problem with cable tension contributing to the failure of solder joints.

A new design approach to the interconnection was indicated to increase field reliability and save space.

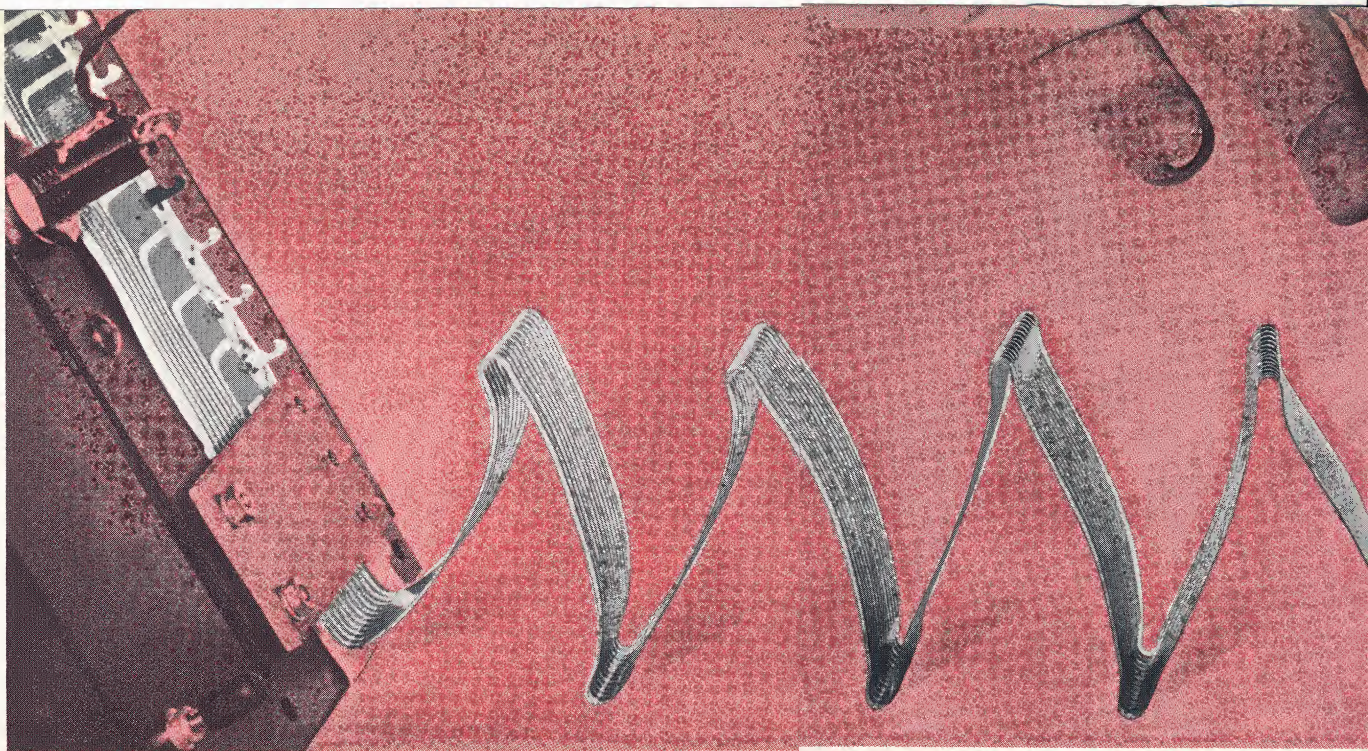
THE SOLUTION

Working in cooperation, the Fischer & Porter product design engineer and the FLEXPRINT Products Division engineers developed a FLEXPRINT accordion cable using 2 oz. (.0027") copper conductors encapsulated in thermoplastic film having good plastic memory.

The resulting cable has increased reliability of the interconnection to the point where it is no longer considered a factor. Its tension is carried by a strain relief bar at the back end and by an integrated strain relief device in the PC connector.

The space bonus provided by use of the FLEXPRINT accordion cable helped Fischer & Porter to add a third pen assembly to the recorder — **an increase in function of 50%** in the same space.

**PROCESS INSTRUMENT MANUFACTURER
INCREASES RELIABILITY AND FUNCTION
WITH COST REDUCING FLEXPRINT CIRCUITRY**



Fully retracted this FLEXPRINT accordion cable is less than 1" long . . . extended it is over 24" long.

THE FLEXPRINT ACCORDION CABLE

FEATURES

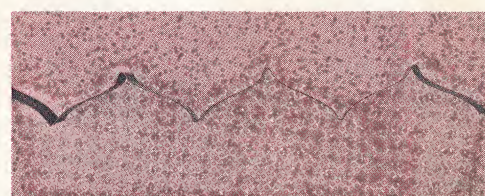
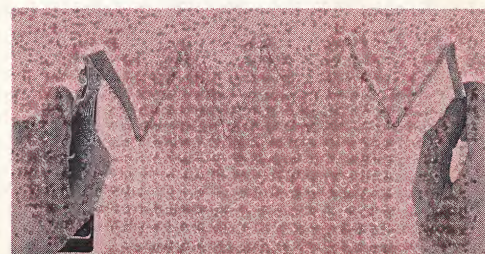
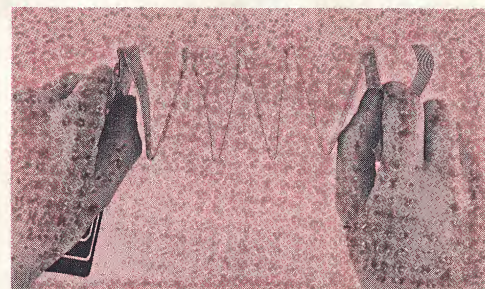
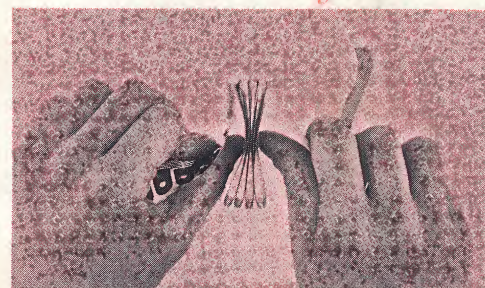
1. Accordion developed in a cooperative effort between the Fisci and Sanders Associates FLEXPRINT Products Division Engineering Department. The cable is not pressed to a sharp apex, but maintains at least a minimum radius. Also be noted that when under stretch that the straightening force is reduced.
2. Saved 40% in installed cost.
3. FLEXPRINT ACCORDION saved enough space in package to allow for more components.
4. Increased reliability 100%.
5. Delivered ready to install, it is 100% factory inspected and tested for dielectric resistance.
6. Assembly time approximately 11 minutes, one third the previous method.
7. Eliminated wiring errors.
8. Gold plated contact areas factory produced and 100% perfect, no need for P.C. board connector.
9. Large "fanned out" dished solder pads to fit a standard T-1 package speeds soldering, increases reliability.

SPECIFICATIONS

Cable length, extended	Max. approx. 24"	Conductors
Cable length, retracted	Approx. 1"	Conductors
Cable thickness	Approx. .012"	Volts
Cable width	Approx. 1 3/8"	Power
Plastic Insulation	5 mil. Fluorocarbon Film	Current
Copper conductors	2 oz. rolled copper (.0027")	Spec

Twelve dished terminal pads with 1/8" diameter hole, to fit standard T-1 package.
Conductors — 15/16" left bare at straight end and gold plated at other end for POS-E-KON connector.

Apexes of accordion are formed with a designed 1/8" diameter.





FLEXPRINT ACCORDION CABLE

in a cooperative effort between the Fischer & Porter Engineering Department
ates FLEXPRINT Products Division Engineering Department. Note that it is
arp apex, but maintains at least a minimum radius of $\frac{3}{32}$ " at all times. It will
when under stretch that the straightening moments are distributed.

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100%.

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roximately 11 minutes, one third the previous.

ors.

reas factory produced and 100% perfect, ready to solder to a standard

dished solder pads to fit a standard Type "Y" barrier strip with $\frac{1}{8}$ " pins
reases reliability.

Max. approx. 24"

Approx. 1"

Approx. .012

Approx. $1\frac{3}{8}$ "

.5 mil. Fluorocarbon Film

.2 oz. rolled copper (.0027")

Conductor size060"

Conductor spacing040" min.

Volts 117 60 cycle

Power 30 watts

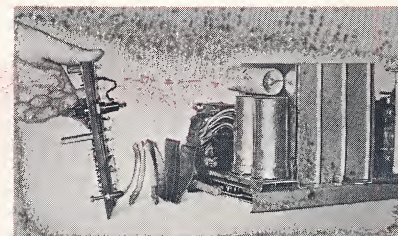
Current 2 amps

Specified Life Test 50,000 cycles

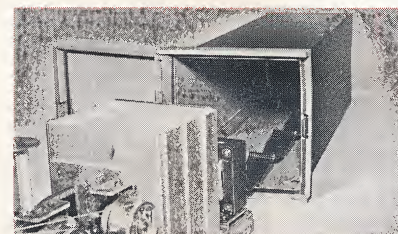
minial pads with $\frac{1}{8}$ " diameter hole, to fit standard Type "Y" strip.

" left bare at straight end and gold plated, formed to take a standard

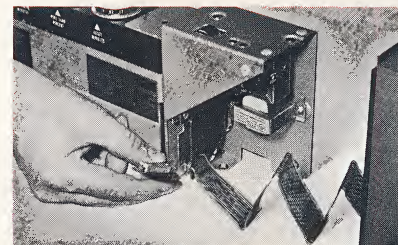
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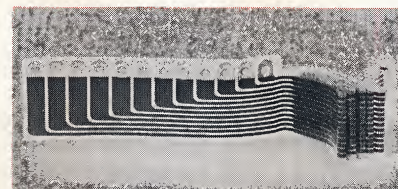
FLEXPRINT ACCORDION CABLE takes very little space when chassis is in operating position.



Chassis fully removed for inspection but still inter-connected to fixed back panel of case.



The PC connector is about to be pressed onto the Printed Circuit board. Note that it will be rotated through 90°. There is ample flexibility to allow considerable flexing and twisting.



Large terminal pads designed to fit a standard type "Y" barrier strip, easy to handle and solder.



THE FLEXPRINT ACCORDION CABLE

FEATURES

1. Accordion developed in a cooperative effort between the Fischer & Porter Engineering Department and Sanders Associates FLEXPRINT Products Division Engineering Department. Note that it is not pressed to a sharp apex, but maintains at least a minimum radius of $\frac{3}{32}$ " at all times. It will also be noted that when under stretch that the straightening moments are distributed.
2. Saved 40% in installed cost.
3. FLEXPRINT ACCORDION saved enough space in package to allow 50% increase in function.
4. Increased reliability 100%.
5. Delivered ready to install, it is 100% factory inspected and tested for continuity and high potential dielectric resistance.
6. Assembly time approximately 11 minutes, one third the previous.
7. Eliminated wiring errors.
8. Gold plated contact areas factory produced and 100% perfect, ready to solder to a standard P.C. board connector.
9. Large "fanned out" dished solder pads to fit a standard Type "Y" barrier strip with $\frac{1}{8}$ " pins speeds soldering, increases reliability.

SPECIFICATIONS

Cable length, extendedMax. approx. 24"

Cable length, retractedApprox. 1"

Cable thicknessApprox. .012

Cable widthApprox. $1\frac{3}{8}$ "

Plastic Insulation.....5 mil. Fluorocarbon Film

Copper conductors2 oz. rolled copper (.0027")

Conductor size060"

Conductor spacing040" min.

Volts117 60 cycle

Power30 watts

Current2 amps

Specified Life Test50,000 cycles

Twelve dished terminal pads with $\frac{1}{8}$ " diameter hole, to fit standard Type "Y" strip.

Conductors — $\frac{1}{16}$ " left bare at straight end and gold plated, formed to take a standard POS-E-KON connector.

Apexes of accordion are formed with a designed $\frac{1}{8}$ " diameter.

FLEXPRINT[®]

flexible printed circuitry makes a component out of wiring

- untangles problems of assembling complex wiring circuits
- prevents wiring errors
- cuts time required for production, quality control and maintenance
- reduces size and weight of end equipment
- costs less in quantity than conventional cable
- provides complete design freedom, lets you create new directions in electronics

If you would like to talk to one of our sales engineers and find out how Flexprint circuits can help solve *your* wiring problems, write to Flexprint Products Division, Sanders Associates, Inc., Nashua, New Hampshire, or call Area Code 603 TUxedo 3-3321.

FLEXPRINT PRODUCTS DIVISION



SANDERS ASSOCIATES, INC.

CREATING NEW DIRECTIONS IN ELECTRONICS